COMPARATIVE ENVIRONMENTAL HEALTH RISK ASSESSMENT FOR USE IN POLICY-MAKING: THE VEGAS PROJECT

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Background and Aims:

Environmental stressors in Germany need to be examined regarding their health impact to develop suitable policies. The environmental burden of disease (EBD) concept combines aspects of morbidity and mortality of environmental stressors in the form of DALYs (disability-adjusted life years), which is useful for comparative risk assessment (CRA). The VegAS project [distribution-based analysis of health effects from environmental stressors] aims at providing a basis for policy-making.

Methods:

Seven environmental stressors – benzene, cadmium, noise, ozone, particulate matter, perfluorinated surfactants, and second-hand smoke – were considered because of their relevance to public health. Evidence levels of health effects were defined referring to international guidelines, reviews, meta-analyses, and epidemiological and toxicological studies. Exposure-response functions (ERFs) and population-based exposure data were evaluated to calculate the EBD. Parts of the DALY approach are discussed extensively and critically. Uncertainties are described and evaluated.

Results:

Up to ten health effects attributable to a single environmental stressor were identified with strong or moderate scientific evidence. Exemplary, cadmium causes different kinds of cancer, acute myeloid leukemia is attributable to benzene, and environmental noise induces myocardial infarction and sleep disturbance. Evidence differs strongly depending on the state of research of stressor and health outcome. Differences were also observed regarding availability (e.g., population-based registries, surveys), quality of ERFs and transferability to the general German population. Detailed uncertainty and sensitivity analyses are part of the project to enable reliable CRA results.

Conclusions:

Through high quality standards, the VegAS project will contribute to a realistic CRA by making use of the strengths of EBD analyses while carefully considering its limitations. A transparent application of the VegAS approach will substantially augment the options of policy-making. Final results are available in early 2012.